Patent application of

William E. McLaughlin

127 Culpepper Road, Penllyn, PA 19422

Citizen of the United States of America

Title of the Invention: ***Infra-red Laser Device And Method For Searching For Lost Item***

Schedule regarding Federally sponsored research: Inapplicable

Reference to Microfiche Appendix: Inapplicable

BACKGROUND

Field of Invention

In some athletic games, such as golf, a playing device, such as a golf ball, is temporarily lost, so that one or more players must devote time to searching. Sometimes a golf ball is not found, thus adding to the expense of the sport. Golf balls are not extremely expensive. Few golfers care to spend large amounts for money for a retrieval system involving golf balls costing significantly more than conventional golf balls. The method and apparatus are also useful for searching for and retrieving creatures, experimentally launched model airplanes, or other items which might be temporarily lost.

PRIOR ART

Horchler 3,782,730 uses a magnetically actuated switch to turn on or off a radio oscillator at the core of the golf ball, whose radio signal can be monitored by the player whenever the ball is temporarily lost.

Engimeier 5,423,549 employs a rechargeable battery and a system for electromagnetically transmitting energy to the battery charger, of a Horchler type of golf ball.

Little 5,626,531 employs a capicatance system which tags such ball whenever activated by the radiation from by the radiation from a Horchler-type of target-seeking monitor.

Kroll et al. 5,662,534 also uses a monitor sending out a series of pulses of radio beams, and analyzing the reflected radio waves. In Kroll et al, the golf ball features a generic reflector of such radio beams.

Valintino 5,132,622employs a golf ball having a metal center and the combination of a

William E. McLaughlin, *Infra red Laser Device And Method For Searching For Lost Item* metal detector and target seeking scoop to retrieve a lost golf ball

Digital pulses of infra red laser beams having a wave length of 1310 nm , are suitable for optical wireless systems over distances of a few kilometers, according to Heatley et al, IEEE Communications magazine, December, 1998, pp 72 82

Although radar systems have been helpful in locating gigantic targets, their effectiveness with items as small as a golf ball have been unsatisfactory Moreover, a golf ball containing significant mass of transmitter, tagging components, capacitors, etc has flight characteristics which are dysfunctional Around the world, the number of golfers , and the number of golf balls manufactured, has continued to climb, thus accentuating the long standing need for a system for retrieving a temporarily lost ball Similar problems occur with croquet balls and other sports paraphernalia Model airplanes and creatures are sometimes temporarily lost, and are retrievable using the apparatus and method of the present invention

SUMMARY OF INVENTION

In accordance with the present invention, a searcher utilizes a monitoring device emitting a laser beam of a particular wave length, and the reflected light attributable to such laser beam is analyzed for identifying the target zone providing the most intense reflection, inasmuch as the item to be retrieved has been modified to preferentially reflect light when such laser beam reaches it. Earphones or a meter, or other appropriate indicating means, can be used in monitoring for the targeted zone having the temporarily lost golf ball or the like The flight characteristics of the golf ball of the present invention are substantially identical to those of a conventional golf ball, because the ball of the present invention differs from a conventional golf ball only by reason of having, on its exterior surface, an appropriate hologram comprising components particularly reflecting a laser beam of predetermined wavelength. In the process of the present invention, a conventional golf ball [or other athletic paraphernalia such as a croquet ball or a model airplane or a creature] is cleaned and then is labeled [usually coated] with the material imparting the selective reflectivity for the laser beam of the preselected wavelength The term "hologram" is employed for certain types of such selected reflectivity. After the athletic paraphernalia has been thus treated , a sufficient amount of the selected material remains on the item to selectively respond to the laser beam having the preselected wavelength. It has been estimated that even after a holgramized ball has been played

for 180 holes, or ten rounds of golf, it might retain effective amounts of the hologram material Some golf balls have a plurality of approximately hemispherical depressions which retain the selective reflectivity even when some of the outermost portions of the ball are dirty. Because the cost of coating the ball with the selective material is not prohibitive, a golf course can repeat the treatment for a ball after even 9 holes of use Occasionally a freshly hologramized ball becomes excessively dirty and is not adequately responsive to the target-seeking monitoring system featuring the laser beam of predetermined wavelength. However, the dirt accumulated during normal golf games does not impair the effectiveness of the retrieval system of the present invention. The plastic film deposited in a depression of the golf ball can be molded to impart a hologram of the type responsive to the laser beam reaching such molded ridges having angles and spacing appropriate for the selected wavelength

DRAWING

In the accompanying drawings, Fig 1 is a flowsheet of the process of the present invention.

Fig 2 is a schematic presentation of how a laser beam, upon encountering a golf ball having in its dimples an embossed hologram grating of 5 or 15 microns would reflect such laser beam to the monitoring device

Fig 3 Is a schematic presentation of a monitoring device comprising an emitter of a laser beam of predetermined wavelength, a receptor measuring the reflected light attributable to such laser beam; an indicating means such as a meter having a visual display or an audio signal advising the searcher of the relative intensity of the reflected light attributable to such laser beam.

Fig 4 Is a schematic view of a golf ball having dimples or depressions

Fig 5 is a schematic view of angled ridges or grating embossed into the plastic coating of a dimple of a golf ball

Fig 6 is a schematic presentation of a searcher using a monitoring device and earphones to search for a temporarily lost golf ball, thus providing the golfer with audible clues about how accurately he has focused the monitoring device to target the temporarily lost golf ball

Fig 7 is a schematic view of a laser beam being reflected from a golf ball having an appropriate coating in its dimples

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Fig. 8 is schematic view of an apparatus for embossing or molding a hologram grating in the coating in the dimples of a golf ball

Fig. 9 is a schematic presentation of a conveyor system for electrostatically coating a golf ball

DESCRIPTION OF PREFERED EMBODIMENTS

Example I

A golf ball 11 having dimples 12 and bumps 13, and resembling that of Fig. 2 is cleaned and then positioned by a plurality of pins on a conveyor system 14 of Fig. 9. The ball is thus advanced through an electrostatic charging zone 15, shown schematically in Fig. 9, and then into a coating zone 16. Nozzles 17 direct a controlled amount of finely pulverized coating material [having the opposite electrostatic charge] toward the golf ball 11 in the coating zone 16 so that the coating material is applied uniformly to the to the golf ball 11. The coating particles are a blue pigment consisting of the chelated nickel formate derived from an aqueous solution of the tetra-ammonium salt of ethylene diamine tetra-acetic acid. As a result of the electrostatic attractions, an extremely thin film of the nickel pigment is deposited on the golf ball, the coating being sufficiently uniform that the flight characteristics of the coated ball are not impaired. Optionally, the uniformly coated ball can pass through a heating zone 18 in which the coating is more tenaciously bonded to the surface of the golf ball, and then through a cooling zone 19. After the ball has been thus processed, it is removed from the conveying system 14, and is ready for use.

During normal use, the ball performs essentially like a similar untreated ball. If, however, a player blunders, and hits a ball into a rough area where it is temporarily lost, the player utilizes a monitoring device 30 (Fig. 2). Such monitoring device 30, as shown in Fig. 3, includes a laser beam generator 31 sending a monochromatic laser beam of preselected wavelength from the monitoring device 30 through a central nozzle 32. A photoelectric cell 33 detects reflected light attributable to such laser beam, thus generating an electric signal which is amplified by an amplifier 34 for actuating an indicator 35 (Fig. 2) alerting the golfer about the intensity of the reflected laser beam. So long as the nozzle 32 directs the laser beam to general areas, only trivial amounts of reflection are indicated. However, when the player has the monitor's nozzle 32 directed at the temporarily lost ball, the indicator alerts the player that his targeting of the lost ball has started to be

useful. On moving closer to the target, the intensity of the indicted reflection is greater. The closer the distance to the target, the more useful are the indications of accurate targeting. Thus a player could retrieve a temporarily lost ball having the coating adapted to reflect the pre-selected wavelength of laser beam. Such pre-selected wave length should ordinarily be 1310 nm, but either 1550 nm or 880 nm share with 1310 nm the ability to penetrate atmospheres containing moisture. Communication systems relying upon optical wireless employ digitalized pulses of laser beams, but target-searching laser beams are desirably continuous. The monitoring device 30 comprises a battery pack 36 energizing a power supply 37. A lens 38 focuses the reflected light onto the photoelectric cell 33.

Example 2

A blue cobalt pigment comprising phthalimide is dispersed as an emulsion in water, which is applied as a uniform film on the golf ball, which after drying, provides a film which does not impair the flight characteristics of the ball. A grating or ridges having angles is embossed or molded into the coating thus deposited in the dimples. However, such thin film provides excellent reflectivity of a laser beam having the wave-length responsive to such pigment. In quality control tests, the hologram coating is shown to be quite uniform. The flight characteristics of the coated ball match the flight characteristics of an uncoated ball. By using a hand held monitoring device 30 and earphones 35a, the player can identify a search zone for a temporarily lost ball, and move closer toward it with increasing accuracy of targeting such lost ball. Upon close proximity, the golf ball is visible, thereby permitting retrieval of such ball.

Example 3

A golf ball is dipped in a liquid imparting a thin film of a copolymer featuring vinylchloride. The thus coated ball is transferred to a molding press in which the copolymer film lining each dimple is embossed to provide a plurality of ridges having angles and spacing designed selectively process a laser beam having a wave length of 1310 nm. Because such laser responsive ridges are in the dimples, they are not dirtied by the normal use of the golf ball. In the event that such golf ball is temporarily lost, in the rough of a golf course, it can be located by directing a laser beam of 1310 nm toward the search area, and refocusing the monitoring device in response to the audio signals measuring the feedback from such laser beam.

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Example 4

Each of a plurality of calves is provided with a jacket having a coating of material selectively responsive to a laser beam of 1310 nm, and allowed to roam in a pasture. By using the monitoring device emitting such a laser beam and measuring the intensity of the feedback, the monitoring device can be successively refocused a plurality of times for locating each of the wandering calves. The same technique is applicable to model airplanes, prisoners, children, and other items which might be temporarily lost.